PanaFlow Z3

Panametrics ultrasonic flow meter for liquids

Applications

The PanaFlow Z3 represents the latest generation of Panametrics ultrasonic flow meters. It is a three-path meter designed specifically for dependable, accurate and repeatable flow measurement of process liquids. With a sleek industrial design and ultra-reliable electronics, it provides operators a cost-effective choice when measurement accuracy and reliability are critical. The capabilities of the PanaFlow Z3 make it the right meter for a number of industries and applications, including:

- Upstream, midstream and downstream oil and gas
- Chemical
- Petrochemical
- Refining
- Power generation
- District energy/HVAC
- Water/wastewater
- Process control and monitoring
- Allocation measurement
- Batching and blending
- Transfer lines
- Cooling water lines
- Pipeline metering
- Loading/unloading
- Plant utilities
- Tank farms
- Irrigation
- Crude refined products

Features and benefits

No drifting, no periodic calibration required		No loss of process control, no downtime, no expense from calibration, and optimization of assets
No pressure drop		No wasted energy from running a pump or need to purchase a larger size pump
No restriction in the pipe		Contamination will not affect meter's measurement (drifting) or cause any damage to meter
No filters or strainers		No maintenance cost
Bi-directional measurement		No additional meters required
No moving parts		No loss of process control, no downtime, no expense from calibration, and optimization of assets
Field replaceable transducers		No risk in measurement, no shutdown costs for transducer maintenance
All cast design		Precision machined flowcell minimizes flow disturbance for better accuracy
Explosion-proof transducer design		More power to transducer at higher voltages, less risk of attenuation in fluid
Full ultrasonic product line		Meet more needs with full product portfolio; one source for all ultrasonic liquid flow meters
SIL Certification		Optional SIL certified configuration for safety criticall applications

Panametrics
a Baker Hughes business

Reliable flow measurement is easy on your budget

The PanaFlow Z3 is a three-path, wetted ultrasonic flow meter that brings together all of the advantages of ultrasonic technology at a very affordable value. Unlike other flow measurement technologies, the PanaFlow Z3 does not require maintenance since it does not have any obstruction in the flow path that could clog the process line or moving parts to be damaged by the flowing fluid.

Also, due to the inherent nature of our ultrasonic flow measurement, the PanaFlow Z3's measurement is not affected by changing process conditions (temperature, pressure, and conductivity) and does not drift over time, which eliminates the requirement for periodic calibration. Without requirements for maintenance and calibration, the PanaFlow Z3 offers high performance with a low cost of ownership.

Fast and easy installation

Installation of wetted systems can be difficult and if they are not installed with precision and with close attention to detail, the reliability and accuracy of the system may not meet specifications. With the new PanaFlow Z3 system, the assembly work is done at the factory. The necessary components are already installed, so all the user needs to do is to bolt the end flanges into place.

Transit time flow measurement

In this method, two transducers serve as both ultrasonic signal generators and receivers. They are in acoustic communication with each other, meaning the second transducer can receive ultrasonic signals transmitted by the first transducer and vice versa.

In operation, each transducer functions as a transmitter, generating a certain number of acoustic pulses, and then as a receiver for an identical number of pulses. The time interval between transmission and reception of the ultrasonic signals is measured in both directions. When the liquid in the pipe is not flowing, the transit time downstream equals the transit time upstream. When the liquid is flowing, the transit time downstream is less than the transit time upstream.

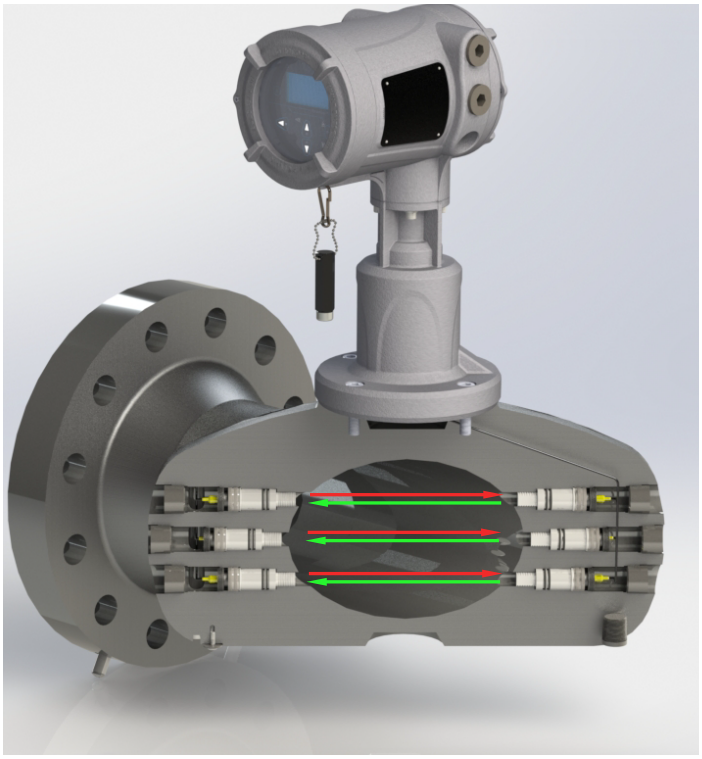
The difference between the downstream and upstream transit times is proportional to the velocity of the flowing liquid, and its sign indicates the direction of flow.

What is the PanaFlow Z3?

The PanaFlow Z3 consists of the Panametrics PanaFlow XMT1000 electronics, three pairs of LX transducers, and sensor body. The XMT1000 is our latest ultrasonic flow transmitter with state-of-the-art flow measurement capability in a rugged enclosure certified for use in hazardous areas. The LX transducer system is our latest advancement in ultrasonic transducer technology and provides accurate, drift-free and obstructionless flow measurement.

LX transducer

The LX transducer system consists of our new integrated LX transducers and our uniquely engineered buffers. The design of this system allows for the safe insertion and removal of the LX transducers at any time without isolating the flow meter, shutting down the process or using any special tools. Together with the XMT1000 electronics and LX transducer, the uniquely designed meter body provides a clean and compact flow meter system.



Transit time flow measurement

Specifications

Operation and performance

Fluid types

Liquids: acoustically conductive fluids, including most clean liquids, and many liquids with small amounts of entrained solids or gas bubbles.

Flow measurement

Correlation transit time model

Accuracy

3 to 24 in (80 to 600 mm)

- ±0.25% of reading for velocities above 1.6 ft/s (0.5 m/s)
- ±1.25 mm/s for velocities below 1.6 ft/s (0.5 m/s)

2 in (50 mm)

- ±0.5% of reading for velocities above 1.6 ft/s (0.5 m/s)
- ±2.5 mm/s for velocities below 1.6 ft/s (0.5 m/s)

Accuracy statement assumes measurement of a single phase homogenous liquid with a fully developed symmetrical flow profile passing through the meter (typically 10 diameters upstream and 5 diameters downstream of straight pipe run).

Applications with piping arrangements that create an asymmetrical flow profile may require extended piping straight runs and/or flow conditioning for the meter to perform to this specification.

Calibration

All meters are water calibrated at ambient conditions and include a calibration certificate.

- 3 points as found 2, 5, and 10 ft/s (0.6, 1.5 and 3 m/s) and 2 points as left 3 and 7 ft/s (0.9 and 2.1 m/s)

Repeatability

- ±0.15% of reading 3 to 24 in (80 to 600 mm)
- ±0.2% of reading 2 in (50 mm)

Range (bidirectional)

-82 to 82 ft/s (-25 to 25 m/s)

Meter body/transducer system

Meter body materials

- Low temperature carbon steel: ASTM SA352 Gr. LCC
- Stainless steel: ASTM SA351 Gr. CF8M
- Duplex stainless steel: ASTM SA995 GR. CD3MWCuN

Transducer system and material

- LX transducers with inserts
- 316 SS or A479 UNS S32760 (Duplex)
- Wetted components Seals
- FKM or EPDM

Process fluid temperature range

- Local mount: -40°F to 302°F (-40°C to 150°C*)
- Remote mount: -40°F to 302°F (-40°C to 150°C)

*Maximum process temperature is 203°F (95°C) when additional analog input/output options are selected

Pressure range

Up to maximum allowable flange operating pressure at temperature per ASME B16.5 or EN1092-1

Piping design

- ASME B31.3
- NACE MR0103/MR0175
- PED PER B31.3, CAT II, A2
- CRN

Weights and dimensions

See drawings 712-2166 (local mount) and 712-2167 (remote mount) for details.

Drawing	Drawing description
712-2166	Outline and installation, Z3, 2 – 24 in. (50 – 600 mm) flow meter system, local mount
712-2167	Outline and installation, Z3, 2 – 24 in. (50 – 600 mm) flow meter system, remote mount

Specifications

Transmitter

Enclosures

Powder coated aluminum (copper free) or stainless steel (SS316) conformal coated

Classifications

US/CAN: Class I, Division 1, Groups B, C, D;
Class I, Zone 1, Ex db IIB+H2 T6...150C;
IP 66/67 Type 4X
SINGLE SEAL
ATEX/IECEx: Ex db IIB+H2 T6...150C FISCO outputs
Ta = -40°C to +65°C, IP 66/67
Operating: -40°F to 149°F (-40°C to +65°C*)
Storage: -40°F to 158°F (-40°C to 70°C)

*Maximum ambient temperature is 60°C (140°F when foundation fieldbus option selected)

Transmitter mounting

Local or remote mounting

Paths

- Three paths : 3 to 24 in (80 to 600 mm)
- Two paths : 2 in (50 mm)

Display

English

128 x 64 mono-color LCD display, configurable for single or dual measurement parameters

Keypad

Built-in magnetic, six-button, lockable keypad

Cable entries

¾" NPT

M20 adapters

Power supplies

Universal 100-240 VAC 50/60 Hz ±10% or 12 to 28 VDC (15W max, 7W typical)

Standard inputs/outputs

- One 4 to 20 mA isolated output, 600 Ohm maximum load, NAMUR NE43
- One additional output, may be configured as either a pulse or frequency output.

Optional input/output

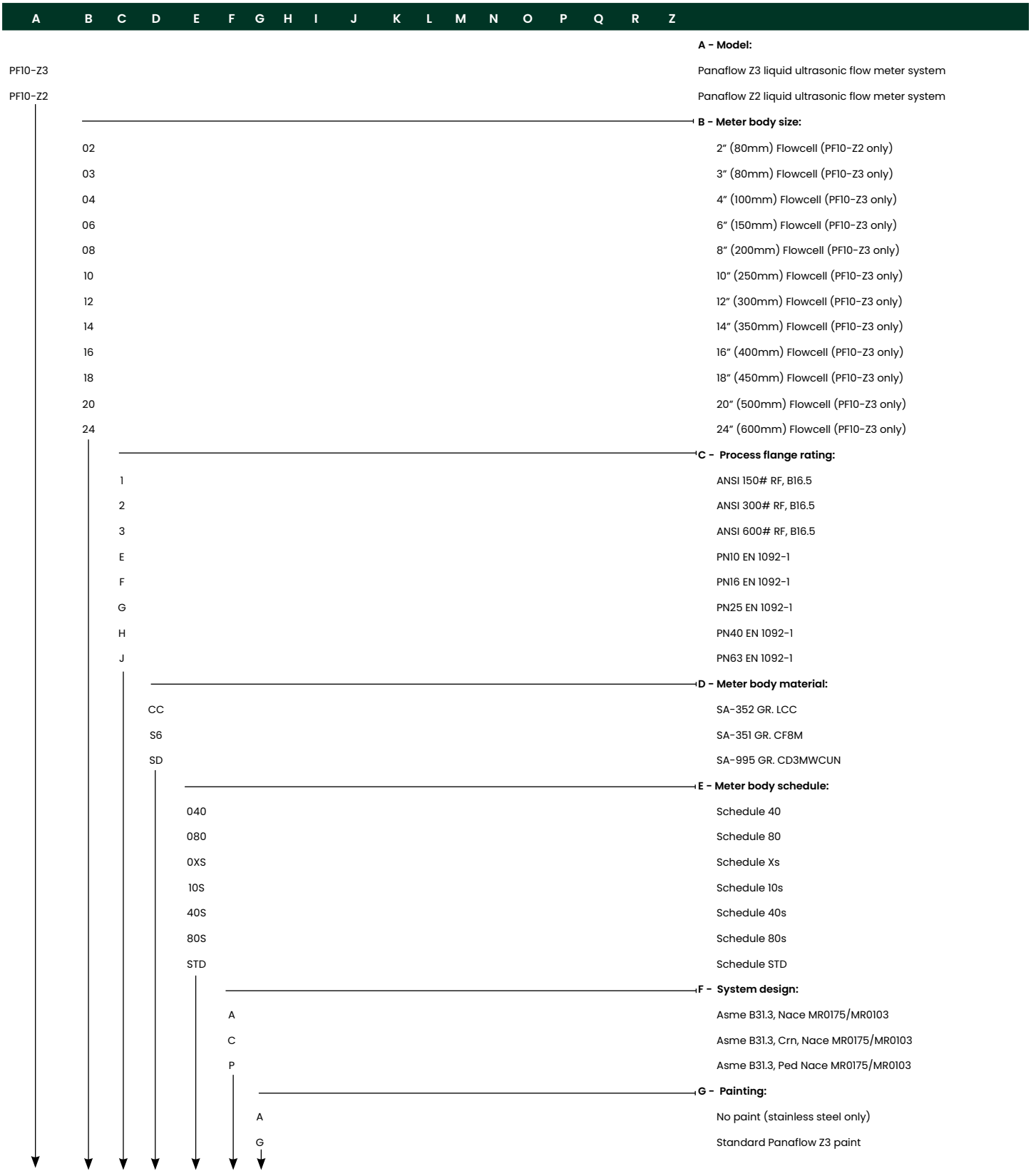
- One 4 to 20 mA (SIL) isolated output, 600 Ohm maximum load, NAMUR NE43 (required for SIL installation)
- Two additional 4 to 20 mA isolated outputs, 600 Ohm maximum load, NAMUR NE43
- One or two 4 to 20 mA isolated inputs, 24-VDC loop power, NAMUR NE43
- One or two isolated, three-wire RTD (temperature) inputs, –148°F to 662°F (–100°C to 350°C), 100 Ohm or 1000 Ohm platinum
- One or two isolated, four-wire RTD (temperature) inputs, –148°F to 662°F (–100°C to 350°C), 100 Ohm or 1000 Ohm platinum

Digital interfaces

- Standard: RS485/Modbus®
- Optional: HART® 7.0 protocol, with four dynamic variables, includes one additional 4 to 20 mA analog output NAMUR NE43
- Optional: Foundation Fieldbus® FISCO, LAS capable NAMUR NE107 with five AI blocks and a PID block

Note: Maximum ambient operating temperature range of transmitter with Foundation Fieldbus® is +60°C.

PanaFlow Z3 part number string



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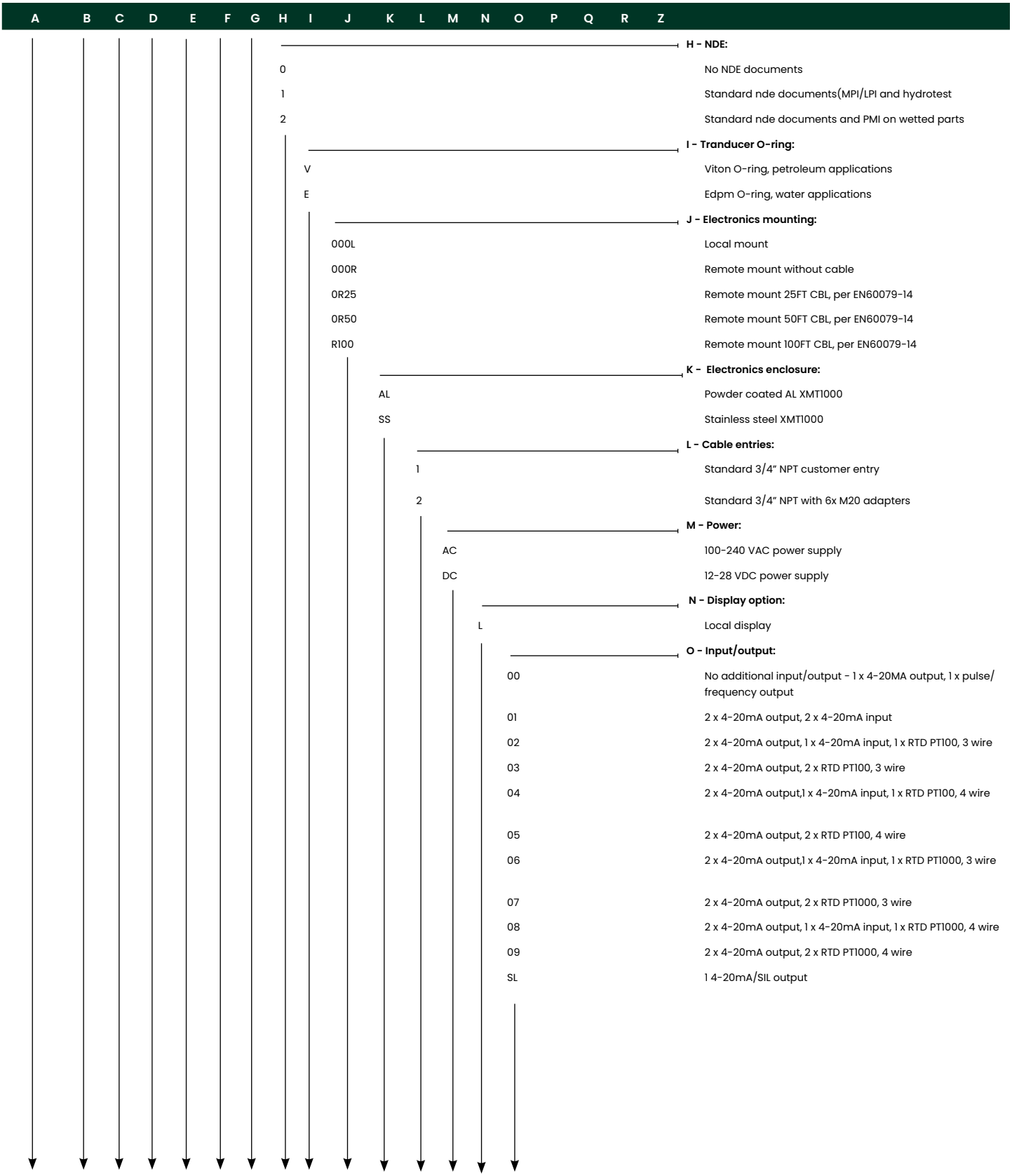

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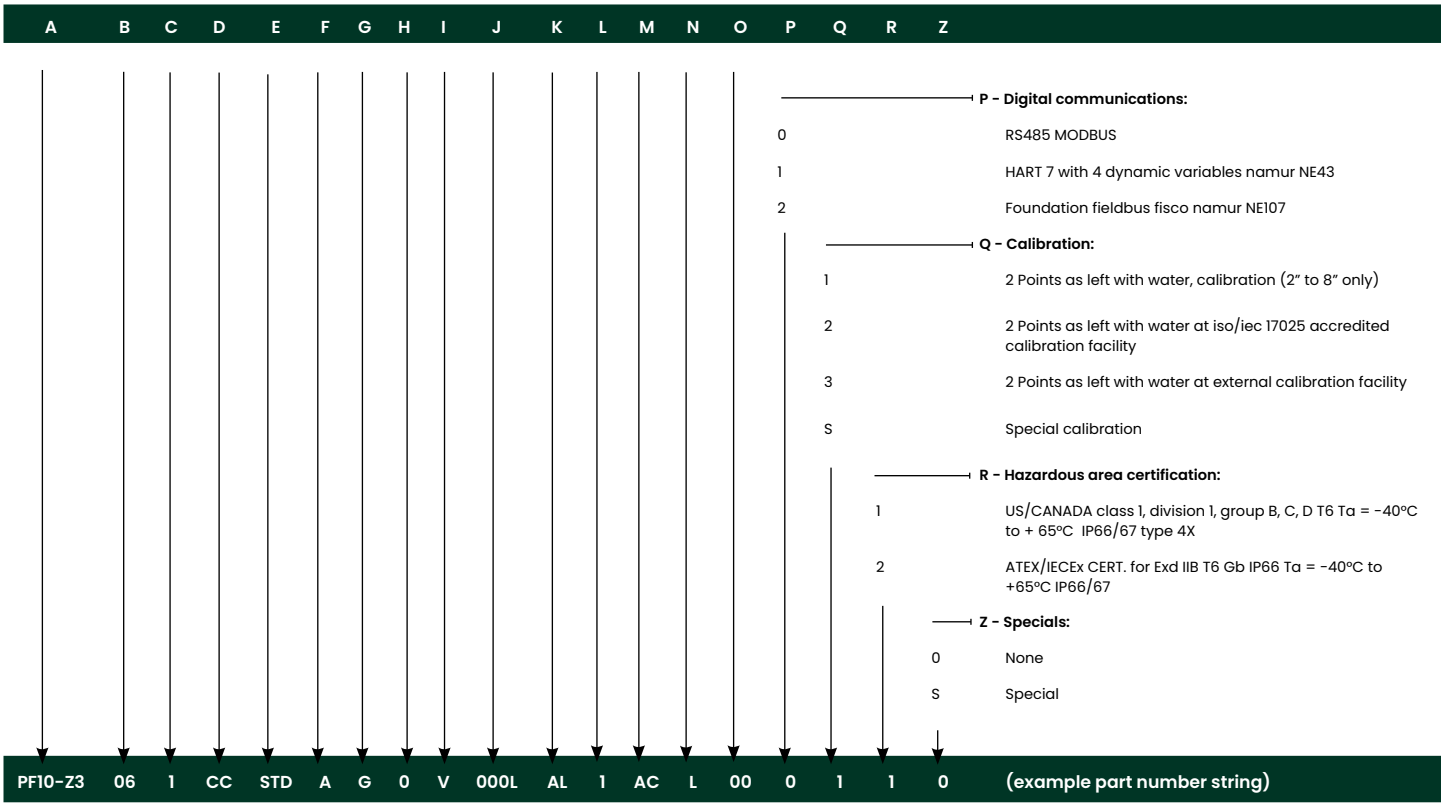

Note: other meter body materials can be offered on request. Please consult factory.

Panametrics, a Baker Hughes Business, provides solutions in the toughest applications and environments for moisture, oxygen, liquid and gas flow measurement. Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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